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CLAIMS

What is claimed is:

1. A method for a global positioning system (GPS) receiver, comprising the steps of:

decoding data encoded upon a spread spectrum modulated signal received from the GPS using a matched filter residing within the receiver, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

2. The method of claim 1, further comprising the steps of performing each decoding step periodically, each at different periods of time.

3. The method of claim 1, further comprising the steps of processing a noninterrupted continuous data stream when decoding the phase shift data.

4. The method of claim 1, further comprising the step of supplying the periodic phase shift data to the matched filter using a circular memory device.

5. The method of claim 4, wherein the matched filter receives the periodic phase shift data from a plurality of satellites and the circular memory device determines which of the periodic phase shift data is supplied to the matched filter.

6. A system for a global positioning system (GPS) receiver, comprising:

a receiver, including data detection circuitry configured to decode data encoded upon a spread spectrum modulated signal received from the GPS using a matched filter residing within the receiver, the data being demarcated into successive data epochs; and

wherein the matched filter decodes periodic phase shift data encoded upon the signal by phase shifts of the data epochs.

7. The system of claim 6, further comprising a circular memory device configured to supply the periodic phase shift data to the matched filter.

8. The system of claim 7, wherein the matched filter receives the periodic phase shift data from a plurality of satellites and the circular memory device determines which of the periodic phase shift data is supplied to the matched filter.

9. The system of claim 8, wherein the circular memory device further comprises:

a data extraction element; and

a plurality of address generators associated with the data extraction element, the address generators configured to determine a location within the circular memory device from which to extract the periodic phase shift data associated with a selected one of the plurality of satellites.

10. A computer readable medium having a program for a global positioning system (GPS) receiver, the program comprising logic configured to perform the steps of:

decoding data encoded upon a spread spectrum modulated signal received from the GPS using a matched filter residing within the receiver, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

11. The computer readable medium of claim 10, further comprising logic configured to performing each decoding step periodically, each at different periods of time.

12. The computer readable medium of claim 1, further comprising logic configured to process a noninterrupted continuous data stream when decoding the phase shift data.

13. The computer readable medium of claim 10, further comprising logic configured to supply the periodic phase shift data to the matched filter using a circular memory device.

14. The computer readable medium of claim 13, further comprising logic configured to allow the matched filter to receive the periodic phase shift data from a plurality of satellites and logic configured to allow the circular memory device to determine which of the periodic phase shift data is supplied to the matched filter.

155. A system for a global positioning system (GPS) receiver, comprising:

means for decoding data encoded upon a spread spectrum modulated signal received from the GPS using a matched filter means residing within the receiver, the data being demarcated into successive data epochs; and

means for decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter means.

16. The system of claim 15, further comprising a means for performing each decoding step periodically, each at different periods of time.

17. The system of claim 15, further comprising a means for processing a noninterrupted continuous data stream when decoding the phase shift data.

18. The system of claim 15, further comprising means for supplying the periodic phase shift data to the matched filter means using a circular memory device means.

19. The system of claim 18, wherein the matched filter means receives the periodic phase shift data from a plurality of satellites and the circular memory device determines which of the periodic phase shift data is supplied to the matched filter.

20. A GPS receiver, comprising:

a first GPS antenna coupled to a digital memory, the digital memory storing first digitized signals obtained through the first GPS antenna;

a second GPS antenna coupled to the digital memory, the digital memory storing second digitized signals obtained through the second GPS antenna;

a digital processor coupled to the digital memory, the digital processor processing the first digitized signals after being stored in the digital memory to provide first position information and processing the second digitized signals after being stored in the digital memory to provide second position information;

a receiver, including data detection circuitry configured to decode data encoded upon a spread spectrum modulated signal received from the GPS using a matched filter residing within the receiver, the data being demarcated into successive data epochs; and

wherein the matched filter decodes periodic phase shift data encoded upon the signal by phase shifts of the data epochs.

21. A method of operating a GPS receiver, the method comprising:

receiving first GPS signals through a first GPS antenna;

digitizing the first GPS signals to provide first digitized signals and storing the first digitized signals in a first digital memory;

receiving second GPS signals through a second GPS antenna;

digitizing the second GPS signal to provide second digitized signals and storing the second digitized signals in one of the first digital memory and a second digital memory;

processing in a digital processor the stored first digitized signals to provide a first position information and processing the stored second digitized signals to provide a second position information;

selecting one of the first position information and the second position information to provide a selected position information;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

22. A method for determining a position of a mobile global positioning system receiver, the mobile global positioning system receiver receiving global positioning system signals from at least one of a plurality of global positioning system (GPS) satellites, the method comprising:

receiving a cellular communication signal in a mobile communication receiver coupled to the mobile global positioning system receiver, the cellular communication signal having a time indicator which represents a time event;

associating the time indicator with data representing a time of arrival of a GPS satellite signal at the mobile global positioning system receiver;

determining position information of the mobile global positioning system receiver, wherein the data representing the time of arrival of the GPS satellite signal and the time indicator are used to determine the position information of the mobile global positioning system receiver and wherein the cellular communication signal supports 2-way communications;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

23. A method of operating a global positioning system (GPS) receiver, comprising:

sensing whether GPS signals are capable of being received from GPS satellites and providing an activation signal when GPS signals are capable of being received;

maintaining the GPS receiver in a low power state;

activating the GPS receiver from the lower power state upon detecting the activation signal;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by ~~phase shifts of~~ the data epochs using the matched filter.

24. A method for using a dual mode GPS receiver, the method comprising the steps of:

activating the GPS receiver in a first mode of operation including,

receiving GPS signals from in view satellites;

downconverting and demodulating the GPS signals to extract Doppler information regarding in view satellites and to compute pseudorange information;

storing the Doppler information;

detecting when the GPS receiver is experiencing blockage conditions and activating a second mode of operation in response thereto, the second mode including, digitizing the GPS signals at a predetermined rate to produce sampled GPS signals; and

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

25. In a method for determining the position of a remote unit, a process comprising:

receiving, at the remote unit from a transmission cell in a cellular communication system, a Doppler information of a satellite in view of the remote unit;

computing, in the remote unit, position information for the satellite by using the Doppler information without receiving and without using satellite ephemeris information;

decoding data encoded upon a signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

26. A method of using a base station for providing a communications link to a mobile GPS unit, the method comprising:

determining Doppler information of a satellite in view of the mobile GPS unit, wherein the Doppler information is used by the mobile GPS unit to determine a position information for the satellite;

transmitting from a transmission cell in a cellular communication system the Doppler information of the satellite in view to the mobile GPS unit wherein the mobile GPS unit determines the position information without receiving and without using satellite ephemeris information;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

27. A method of determining the location of a remote object, comprising the steps of:

transporting a positioning sensor to a remote object;

repositioning the positioning sensor to a fix position such that the positioning sensor is capable of receiving positioning signals, the fix position being in a known position relative to the position of the remote sensor;

storing a predetermined amount of data in the positioning sensor while the positioning sensor is located at the fix position, the data comprising the positioning signals;

processing the data to determine the location of the fix position;

computing the location of the remote object using the location of the fix position;

decoding data encoded upon a signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

28. A method of tracking a remote object comprising the steps of:

fitting a remote object with a positioning sensor configured to receive and store positioning information when the remote object is in a fix position;

positioning the remote object in a fix position such that the positioning sensor is capable of detecting an activation signal;

receiving and storing a predetermined amount of data in the positioning sensor, the data comprising positioning information;

processing the data to determine the location of the fix position;

decoding data encoded upon a signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

29. A computer readable medium containing a computer program having executable code for a GPS receiver, the computer program comprising:

first instructions for receiving GPS signals from in view satellites, the GPS signals comprising pseudorandom (PN) codes;

second instructions for digitizing the GPS signals at a predetermined rate to produce sampled GPS signals;

third instructions for storing the sampled GPS signals in a memory; and

fourth instructions for processing the sampled GPS signals by performing a plurality of convolutions on the sampled GPS signals, the processing comprising performing the plurality of convolutions on a corresponding plurality of blocks of the sampled GPS signals to provide a plurality of corresponding results of each convolution and summing a plurality of mathematical representations of the plurality of corresponding results to obtain a first position information; and

wherein the fourth instructions are designed to:

decoding data encoded upon a signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

30. A computer readable medium containing an executable computer program for use in a digital processing system, the executable computer program when executed in the digital processing system causing the digital processing system to perform the steps of:

performing a plurality of convolutions on a corresponding plurality of blocks of sampled GPS signals to provide a plurality of corresponding results of each convolution;

summing a plurality of mathematical representations of the plurality of corresponding results to obtain a first position information;

decoding data encoded upon a signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

31. A method of calibrating a local oscillator in a mobile GPS receiver, the method comprising:

receiving a precision carrier frequency signal from a source providing the precision carrier frequency signal;

automatically locking to the precision carrier frequency signal and providing a reference signal;

calibrating the local oscillator with the reference signal, the local oscillator being used to acquire GPS signals;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

32. A method of using a base station to calibrate a local oscillator in a mobile GPS receiver, the method comprising:

producing a first reference signal having a precision frequency;

modulating the first reference signal with a data signal to provide a precision carrier frequency signal;

transmitting the precision carrier frequency signal to the mobile GPS receiver, the precision carrier frequency signal being used to calibrate a local oscillator in the mobile GPS receiver, the local oscillator being used to acquire GPS signals;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

33. A method of deriving a local oscillator signal in a mobile GPS receiver, the method comprising:

receiving a precision carrier frequency signal from a source providing the precision carrier frequency signal;

automatically locking to the precision carrier frequency signal and providing a reference signal;

using the reference signal to provide a local oscillator signal to acquire GPS signals;

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

34. A method of processing position information, the method comprising:

receiving SPS signals from at least one SPS satellite;

transmitting cell based communication signals between a communication system coupled to the SPS receiver and a first cell based transceiver which is remotely positioned relative to the SPS receiver wherein the cell based communication signals are wireless;

determining a first time measurement which represents a time of travel of a message in the cell based communication signals in a cell based communication system which comprises the first cell based transceiver and the communication system;

determining a second time measurement which represents a time of travel of the SPS signals;

determining a position of the SPS receiver from at least the first time measurement and the second time measurement, wherein the cell based communication signals are capable of communicating data messages in a two-way direction between the first cell based transceiver and the communication system;

decoding data encoded upon an SPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

35. A method of processing position information in a digital processing system, the method comprising:

determining a first time measurement which represents a time of travel of a message in cell based communication signals in a cell based communication system which comprises a first cell based transceiver which communicates with the digital processing system and a communication system which communicates in a wireless manner with the first cell based transceiver;

determining a position of a SPS receiver from at least the first time measurement and a second time measurement which represents a time of travel of SPS signals received at the SPS receiver which is integrated with the communication system and is remotely located relative to the first cell based transceiver and the digital processing system, wherein the cell based communication signals are capable of communicating messages from the communication system to the first cell based transceiver; and

decoding data encoded upon a SPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.

36. A method of controlling a communication link and processing data representative of GPS signals from at least one satellite in a GPS receiver, the method comprising:

processing the data representative of GPS signals from at least one satellite in a processing unit, including performing a correlation function to determine a pseudorange based on the data representative of GPS signals;

controlling communication signals through the communication link by using the processing unit to perform the controlling and wherein the processing unit performs demodulation of communication signals sent to the GPS receiver; and

when performing the processing step, performing at least the following steps:

decoding data encoded upon a GPS signal using a matched filter, the data being demarcated into successive data epochs; and

decoding periodic phase shift data encoded upon the signal by phase shifts of the data epochs using the matched filter.